UNITED STATES PATENT AND TRADEMARK OFFICE

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| 10/665,846 | 09/17/2003 | Andrew W. Wilson | ADAPP237 | 8387 |

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| EXAMINER |
|---|
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

PTOL-90A  (Rev. 04/07)

| | Application No. | Applicant(s) |
|---|---|---|
| **Office Action Summary** | 10/665,846 | WILSON, ANDREW W. |
| | **Examiner** | **Art Unit** | |
| | ALAN S. CHOU | 2151 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *17 September 2003*.
2a)☐ This action is **FINAL**.          2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-34* is/are pending in the application.
  4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-34* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  a)☐ All   b)☐ Some * c)☐ None of:
    1.☐ Certified copies of the priority documents have been received.
    2.☐ Certified copies of the priority documents have been received in Application No. _____.
    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
  * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
  Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413)
  Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

## DETAILED ACTION

Claims 1-34 are presented for examination.

### *Claim Rejections - 35 USC § 102*

1.      The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.      Claims 1-4, 10, 11-16 are rejected under 35 U.S.C. 102(e) as being anticipated

by Dellacona U.S. Patent Number 6,799,224 B1 (hereinafter Dellacona).


3.      As per claims 1, 11, Dellacona discloses a method for storing data, comprising:

transmitting a storage operation request to one of at least two controllers, the at least

two controllers being capable of managing communication with a plurality of targets

(see bypass interface cards on column 4 line 24-39); directing the storage operation

request to an operational one of the at least two controllers when the one of the at least

two controllers is inoperable (see initiates logical connect and disconnect of the disk

device on column 4 line 61 to column 5 line 10 and XOR raid on column 5 line 10-15);

processing the storage operation request with the operational one of the at least two

controllers (see hot swap bypass interface card 370 on column 7 line 15-35 and figure

1).  Claims 11 has an additional limitation of generating a plurality of storage volumes

includes at least one storage devices (see electronic device registration devices on column 4 line 48-65).

4.      As per claim 2, Dellacona discloses a method for storing data as recited in claim 1, further comprising: communicating data for storage operations using to the at least to controllers through a network fabric interconnect (see Fibre Channel bus on column 3 line 50-55).

5.      As per claim 3, Dellacona discloses a method for storing data as recited in claim 1, further comprising: communicating data between at least one storage device and at least one host using the operational one of the at least two controllers (see connect and disconnect of disk device by bypass interface cards on column 5 line 1-5).

6.      As per claim 4, Dellacona discloses a method for storing data as recited in claim 1, wherein the storage operation request is one of a request to store of data to a target and a request to read data from a target device, the target device being a storage device (see read and write to disk device on column 4 line 45-55).

7.      As per claim 10, Dellacona discloses a method for storing data as recited in claim 2, wherein the directing the storage operation request includes determining a correct path through the network fabric interconnect to a proper storage device (see connect and disconnect of disk device by bypass interface cards on column 5 line 1-5).

8.      As per claim 12, <u>Dellacona</u> discloses a method for storing data as recited in claim

11, further comprising: assigning control of each of the plurality of storage olumes to a

corresponding separate controller (see electronic device registration on column 4 line

48-65).

9.      As per claim 13, <u>Dellacona</u> discloses a method for storing data as recited in claim

11, further comprising: when a controller for a particular storage container fails,

accessing data located on other storage containers through XOR (see XOR Raid on

column 5 line 10-15).

10.     As per claim 14, <u>Dellacona</u> discloses a method for storing data as recited in claim

11, further comprising: managing the plurality of storage volumes by spreading the

processing of input/output requests among all of a plurality of controllers, each of the

plurality of controllers controlling a corresponding one of the plurality of storage volumes

(see electronic device registration on column 4 line 48-65).

11.     As per claim 15, <u>Dellacona</u> discloses a method for storing data as recited in claim

11, wherein the storage containers are RAID devices (see RAID on column 5 line3 10-

15).

12.    As per claim 16, <u>Dellacona</u> discloses a method for storing data as recited in claim

11, wherein the storage device are disk drives (see disk storage device on columne 4

line 35-40).


<p align="center">***Claim Rejections - 35 USC § 103***</p>

13.    The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

14.    Claims 5, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over

<u>Dellacona</u> as applied to claims 1 above, and further in view of <u>Coates et al.</u> U.S. Patent

Application Publication Number 2005/0246393 A1 (hereinafter <u>Coates</u>).


15.    As per claims 5, 17, <u>Dellacona</u> discloses a method for storing data as recited in

claim 1, wherein the directing of the storage operation request including routing the

storage operation request through a bypass interface card.  <u>Dellacona</u> does not disclose

express routing the request through a L4 router.  <u>Coates</u> teaches the use of a L4 routing

switch for load balancing purposes in a network fabric (see page 2 section [0014]).

<u>Dellacona</u> and <u>Coates</u> are analogous art because they are from the same field of

endeavor, network fabric storage system.  At the time of the invention it would have

been obvious to a person of ordinary skill in the art to incorporate L4 routers as

switching devices in the network fabric.  The motivation for doing so would have been to

allow network load balancing with the router. Therefore, it would have been obvious to combine Dellacona with Coates for the benefit of L4 router in the network fabric to obtain the invention as specified in claims 5, 17.

16.     Claims 6-8, 19-20, 21-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dellacona as applied to claims 5 above, and further in view of Coates et al. U.S. Patent Application Publication Number 2005/0246393 A1 (hereinafter Coates), and further in view of Neal et al. U.S. Patent Number 6,990,528 B1 (hereinafter Neal).

17.     As per claims 6, 20, 21 neither Dellacona nor Coates disclose expressly the use of remote direct memory access between devices and the routers. Neal teaches the use of RDMA to access memory spaces on remote nodes (see column 7 line 27-35). Dellacona and Neal are analogous art because they are from the same field of endeavor, network fabric storage system. At the time of the invention it would have been obvious to a person of ordinary skill in the art to incorporate RDMA accessing techniques within the network fabric. The motivation for doing so would have been to allow devices to remotely access memories from other devices. Therefore, it would have been obvious to combine Dellacona with Neal for the benefit of using RDMA in the network fabric to obtain the invention as specified in claims 6, 20, 21.

18.     As per claim 22, <u>Neal</u> discloses a network architecture as recited in claim 21,

wherein each one of the at least two routers utilizes at least one internal queue pair to

communicate with at least one external queue pair of the host (see send/receive work

queue (WQ) on column 1 line 40-64).


19.     As per claims 23, 24, 26, 29, <u>Neal</u> discloses a network architecture as recited in

claim 21, wherein the each one of the at least two routers communicates with the host

or the controllers through reliable connection (RC) sessions (see RC sessions on

column 1 line 45-50).


20.     As per claims 25, 27, 28, <u>Neal</u> discloses a network architecture as recited in

claim 21, wherein the router communicates with the at least two controllers through

reliable datagram (RD) sessions (see RD sessions on column 1 line 45-50).


21.     As per claim 30, <u>Dellacona</u> discloses a network architecture as recited in claim

21, wherein the at least two controllers are RAID controllers (see RAID on column 5 line

10-15).


22.     As per claim 31, <u>Dellacona</u> discloses a network architecture as recited in claim

21, wherein the plurality of target is a plurality of storage devices (see disk storage

device on column 4 line 35-40).

23.     As per claim 32,  Dellacona discloses a network architecture as recited in claim

21, wherein the plurality of storage devices is a plurality of disk drives (see disk storage

device column 4 line 35-40).

24.     As per claims 33, 34, Dellacona discloses a network architecture as recited in

claim 21, wherein when one of the at least two switches or L4 routers is inoperable, the

operable one of the least two L4 routers or switches is capable of communicating data

between the host and the at least two target devices (see initiates logical connect and

disconnect of the disk device on column 4 line 61 to column 5 line 10 and XOR raid on

column 5 line 10-15).

25.     As per claims 7, 19, neither Dellacona nor Coates disclose expressly the use of

InfiniBand-type fabric.  Neal teaches the use of InfiniBand-type fabric within the storage

network (see column 1 line 33-47).  Dellacona and Neal are analogous art because they

are from the same field of endeavor, network fabric storage system.  At the time of the

invention it would have been obvious to a person of ordinary skill in the art to

incorporate InfiniBand-type fabric within the network storage system.  The motivation for

doing so would have been to allow devices to access other nodes on the SAN network.

Therefore, it would have been obvious to combine Dellacona with Neal for the benefit of

incorporating InfiniBand-type fabric in the network storage system to obtain the

invention as specified in claims 7, 19.

26.    As per claim 8, Dellacona discloses a method for storing data as recited in claim

7, wherein the transmitting the storage operation request includes transmitting the

request through an operation one of at least two bridge chips (see bridge chips on

column 6 line 30-45).


27.    Claims 9, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Dellacona as applied to claims 8 above, and further in view of Coates et al. U.S. Patent

Application Publication Number 2005/0246393 A1 (hereinafter Coates), and further in

view of Neal et al. U.S. Patent Number 6,990,528 B1 (hereinafter Neal), and further in

view of Fox et al. U.S. Patent Application Publication Number 2002/0147945 A1

(hereinafter Fox).


28.    As per claims 9, 18, neither Dellacona nor Coates disclose expressly the use of

SATA-IB bridge chips. Fox teaches the use of SATA standard with the Fibre Channel

networks (see page 3 section [0025]). Dellacona and Fox are analogous art because

they are from the same field of endeavor, network fabric storage system. At the time of

the invention it would have been obvious to a person of ordinary skill in the art to

incorporate SATA type bridge chips into network fabric within the network storage

system. The motivation for doing so would have been to allow SATA devices to interact

with other nodes on the fabric network. Therefore, it would have been obvious to

combine Dellacona with Fox for the benefit of incorporating SATA-IB bridge chips within

the network fabric obtain the invention as specified in claims 9, 18.

29.    The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

a) Distributed Storage Resource Management in a Storage Area Network by

Harris et al., U.S. Patent Application Publication Number 2005/0091221 A1.


Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Alan S. Chou whose telephone number is (571) 272-

5779.  The examiner can normally be reached on 7am-3pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, John Follansbee can be reached on (571)272-3964.  The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system.  Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).


AC
/John  Follansbee/

Supervisory Patent Examiner, Art Unit 2151